TITLE OF THE INVENTION

IMAGE-FORMING APPARATUS AND METHOD FOR CONTROLLING THE SAME

5 ## BACKGROUND OF THE INVENTION

Field of the Invention

[0001]   The present invention relates to an image-forming apparatus which includes a recording unit provided with a

10 non-paper-medium supplier which supplies a non-paper medium, which is a medium other than paper, to a printing unit in addition to a paper-medium supplier which supplies a paper medium to the printing unit. In addition, the present invention also relates to an image-forming apparatus such as

15 a multifunction printer (MFP) which has a facsimile function and a method for controlling the image-forming apparatus.

Description of the Related Art

[0002]   Recently, inkjet printers including a non-paper-medium supplier which supplies a non-paper medium, such as a

20 compact disc recordable (CDR), to a printing unit in addition to a paper-medium supplier, such as an automatic sheet feeder (ASF), which supplies a paper medium to the printing unit have become popular. In such an inkjet printer, data processed by an information processing

25 terminal such as a personal computer (PC) can be printed on

the non-paper medium.

[0003]   On the other hand, multifunction machines which can be connected to an information processing terminal such as a PC, which include a reading unit constructed of contact image sensors (CIS) and charge-coupled devices (CCDs), and which serve various functions such as a copy function, a PC print function, a facsimile function, etc. have also become popular.

[0004]   Accordingly, a multifunction machine which includes a recording device (printer) having the non-paper-medium supplier which supplies the non-paper medium such as a CDR to the printing unit can be obtained.

[0005]   In the case in which the recording machine including the non-paper-medium supplier which supplies the non-paper medium such as a CDR to the printing unit is mounted in the multifunction machine having functions such as a copy function, a PC print function, a facsimile function, etc., the paper-medium supplier and the non-paper-medium supplier must be used selectively depending on the function performed.

[0006]   For example, if the non-paper-medium supplier is attached to the main body of the image-forming apparatus when a normal copying process or a facsimile-receiving process is performed, there is a risk that a copy image or a facsimile image will be printed on the non-paper medium such

as a CDR.

[0007]   In addition, if a printing process using the paper-medium supplier is started when the non-paper-medium supplier is attached to the main body of the image-forming apparatus, paper jam occurs due to structural reasons and the printing process cannot be performed.

[0008]   Accordingly, if the non-paper-medium supplier is attached to the main body of the image-forming apparatus when the normal copying process or the facsimile-receiving process is started, the copy image or the facsimile image must be reliably prevented from being printed on the non-paper medium such as a CDR. For example, if the copying process is started, activation of the reading unit and the recording unit may be stopped, and if the facsimile-receiving process is performed, received data may be recorded on a storage medium installed in the main body instead of being transmitted to the recording unit.

[0009]   In addition, when a process of printing on the non-paper medium such as a CDR using the non-paper-medium supplier is performed, the process must be stopped immediately if the non-paper-medium supplier is not attached to the main body of the image-forming apparatus.

[0010]   In addition, even when the non-paper-medium supplier is attached to the main body when the process of printing on the non-paper medium such as a CDR using the

non-paper-medium supplier is performed, the process must be stopped immediately if, for example, the non-paper medium such as a CDR is not loaded and it is determined that the printing process using the non-paper-medium supplier cannot

5   be performed normally.

[0011]   In the above-described multifunction machine such as a multifunction printer (MFP), facsimiles can always be received irrespective of whether a user is present, and therefore there is a possibility that a facsimile is

10   received while the non-paper-medium supplier is attached to the main body. In such a case, although an image received via facsimile must be printed on a paper medium, it cannot be printed on the paper medium if the paper medium is not set. In addition, paper jam occurs if the process of

15   printing on the paper medium is forcibly performed.

[0012]   Such a problem can be prevented by storing all of the facsimiles received while the non-paper-medium supplier is attached to the main body in a memory. However, if all of the facsimiles are stored in the memory, the memory

20   eventually becomes full and it becomes impossible to receive facsimiles.

[0013]   More specifically, although it is not an error to attach the non-paper-medium supplier to the main body as in the cases where there is no paper or ink, if the facsimiles

25   are received while the non-paper-medium supplier is attached

to the main body, it eventually becomes impossible to receive them.

[0014]   This problem also occurs in image-forming apparatuses other than facsimile machines.

SUMMARY OF THE INVENTION

[0015]   An object of the present invention is to provide an image-forming apparatus which can prevent a copy image form being printed on a non-paper medium such as a CDR, which can immediately return to the standby mode without performing unnecessary processes such as activation of a reading unit and a recording unit, and which can display the reason why the printing process has stopped on the main body of the image-forming apparatus when the non-paper-medium supplier is attached to the main body and the printing process cannot be performed.

[0016]   Another object of the present invention is to provide an image-forming apparatus in which a facsimile is received manually if the non-paper-medium supplier is attached to the main body and is received by operation after the line is acquired by a telephone so that paper jam, which occurs when the process of printing on the paper medium is forcibly performed, can be prevented even when the non-paper-medium supplier is attached to the main body. In

addition, it is also an object of the present invention to provide a method for controlling the image-forming apparatus.

[0017]   Further objects, features and advantages of the present invention will become apparent from the following description of the preferred embodiments with reference to the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]   Fig. 1 is a schematic block diagram of an image-forming apparatus according to a first embodiment of the present invention.

[0019]   Fig. 2 is a perspective view of the image-forming apparatus in the state in which an CDR guide unit and a paper tray are attached.

[0020]   Fig. 3 is a perspective view of a CDR tray.

[0021]   Fig. 4 is a diagram showing the state in which a CDR is placed on the CDR tray.

[0022]   Fig. 5 is a diagram showing the state in which the CDR tray is inserted in the CDR guide unit.

[0023]   Fig. 6 is a diagram showing the manner in which the CDR guide unit and the CDR tray are attached to the main body.

[0024]   Fig. 7 is a sectional view showing a paper path (paper-medium supplier) used in a process of printing on a

paper sheet.

[0025]   Fig. 8 is a sectional view showing a recording-
medium (CDR) path (non-paper-medium supplier) used in a
process of printing on the CDR.

[0026]   Fig. 9 is a flowchart of a copying process
performed by the image-forming apparatus.

[0027]   Fig. 10 is a flowchart of a facsimile-receiving
process performed by an image-forming apparatus according to
a second embodiment of the present invention.

[0028]   Fig. 11 is a flowchart of a PC printing process
performed by an image-forming apparatus according to a third
embodiment of the present invention.

[0029]   Fig. 12 is a flowchart of a memory-card printing
process performed by an image-forming apparatus according to
a fourth embodiment of the present invention.

[0030]   Fig. 13 is a schematic block diagram of an image-
forming apparatus according to a fifth embodiment of the
present invention.

[0031]   Fig. 14 is a block diagram showing the detailed
construction of a communication controller.

[0032]   Fig. 15 is a flowchart of a facsimile-receiving
process according to the fifth embodiment of the present
invention.

[0033]   Fig. 16 is a flowchart of a facsimile-receiving
process according to a sixth embodiment of the present

invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

5   [0034]   An image-forming apparatus according to the present invention includes a first monitor which detects whether a non-paper-medium supplier is attached to the main body of the image-forming apparatus. When a normal copying process is selected, the copying process is stopped

10   immediately if the first monitor determines that the non-paper-medium supplier is attached to the main body and an error message indicating that a printing process cannot be performed since the non-paper-medium supplier is attached is shown on the main body of the image-forming apparatus.

15   First Embodiment

[0035]   Fig. 1 is a schematic block diagram of an image-forming apparatus 100 according to a first embodiment of the present invention.

[0036]   In the image-forming apparatus 100, a central

20   processing unit (CPU) 101 serves as a system controller and controls the overall operation of the image-forming apparatus 100.

[0037]   A read only memory (ROM) 102 stores control programs executed by the CPU 101, an embedded operating

25   system (OS), etc. In the present embodiment, the control

programs stored in the ROM 102 are used for software control
such as scheduling and task switching under the management
of the embedded OS which is stored in the ROM 102.

[0038]   A random access memory (RAM) 103 is, for example,
a static RAM (SRAM) which stores program control variables,
values assigned by a user, management data for the image-
forming apparatus 100, etc., and a buffer area for various
tasks is allocated in the RAM 103.

[0039]   An image memory 104 is, for example, a dynamic RAM
(DRAM) which stores image data.

[0040]   A data converter 105 performs computer graphics
(CG) expansion of character data and converts image data
into print data.

[0041]   A reading unit 107 optically reads an original
with a contact image sensor (CIS) and converts the obtained
image signal into electrical image data, and a reading
controller 106 performs various image processes such as a
binarization process and a halftone process of the image
data with an image processing controller (not shown) and
outputs high-definition image data.   In the present
embodiment, the reading controller 106 is compatible with
both a sheet-reading-control method in which the original is
conveyed while it is read and a book-reading-control method
in which the original is scanned while it is placed on an
original table.

[0042]   An operation/display unit 108 includes an operating unit which includes number keys, character keys, one-touch dialing keys, mode-setting keys, an enter key, a cancel key, etc. and which is used by the user to input data regarding a terminal to which an image is transmitted or register set data, and a display unit which includes various keys, light-emitting diodes (LEDs), a liquid crystal display (LCD), etc., and which is used for displaying the states of various input operations performed by the user, the operational state of the image-forming apparatus 100, the status information, etc.

[0043]   A communication controller 109 includes a modulator/demodulator (MODEM), a network control unit (NCU), etc. In the present embodiment, the communication controller 109 is connected to an analog communication line (public switched telephone network (PSTN)) 131, and performs communication control under the T.30 protocol and line control of call-ins and call-outs on the communication line.

[0044]   A resolution converter 110 controls resolution conversion, such as millimeter-to-inch resolution conversion, of the image data. The resolution converter 110 can also enlarge or reduce the image size.

[0045]   An encoder/decoder 111 encodes and decodes the image data (MH, MR, MMR, JBIG, JPEG, etc.) processed by the image-forming apparatus 100. The encoder/decoder 111 also

enlarges or reduces the image size.

[0046]   A recording controller 112 performs various image processes such as a smoothing process, a recording-density-correction process, and a color-correction process of image data to be printed with an image processing controller (not shown) and outputs high-definition image data to a universal serial bus (USB) host controller 114.   In addition, the recording controller 112 also controls the USB host controller 114 to periodically obtain data regarding the state of a recording unit 115.

[0047]   A USB function controller 113 performs communication control of a USB interface and protocol control based on the USB standard.   The USB function controller 113 converts data obtained by the USB control task performed by the CPU 101 into packets and transmits the packets to an external information processing terminal 133 via the USB interface.   In addition, the USB function controller 113 also receives USB packets received from the external information processing terminal 133, converts them into data, and transmits the thus obtained data to the CPU 101.

[0048]   The USB host controller 114 controls the communication under the protocol based on the USB standard. The USB standard is used for high-speed two-way data communication, and a plurality of hubs or functions (slaves)

can be connected to a single host (master). The USB host controller 114 serves as a host in the USB communication.

[0049]   The recording unit 115 is a printer such as a laser beam printer and an inkjet printer, and is used for

5   printing a color image or a monochrome image on a print medium. The recording unit 115 communicates with the USB host controller 114 under the protocol based on the USB standard, and serves as a function in the USB communication.

[0050]   A guide sensor 10 is constructed of a micro switch

10   and detects a CDR guide unit 2, which serves as a non-paper-medium supplier, when the CDR guide unit 2 is attached. The output from the guide sensor 10 is input to both the CPU 101 and the recording unit 115.

[0051]   A CDR-P sensor 11 is constructed of a reflective

15   photo-interrupter and detects a CDR 4 placed on a CDR tray 3 when the CDR 4 reaches a print position. The output from the CDR-P sensor 11 is input to the recording unit 115.

[0052]   In the present embodiment, one-to-one USB communication is provided for the recording function.

20   [0053]   The above-described components denoted by reference numerals 101 to 106, 108 to 114, and 117 are connected to each other via a CPU bus 121 which is managed by the CPU 101.

[0054]   Fig. 2 is a perspective view of the image-forming

25   apparatus 100 in the state in which the CDR guide unit 2 and

a paper tray 5 are attached.

[0055]   The paper tray 5 holds paper sheets and is
generally called an automatic sheet feeder. The paper tray
5 is an example of a paper-medium supplier which conveys the
paper sheets. The CDR guide unit 2 is used for printing on
a CDR by the image-forming apparatus 100, and is an example
of a non-paper-medium supplier. A non-paper medium is a
medium other than paper, such as a CDR.

[0056]   Fig. 3 is a perspective view of the CDR tray 3.

[0057]   Fig. 4 is a diagram showing the state in which the
CDR 4 is placed on the CDR tray 3.

[0058]   Fig. 5 is a diagram showing the state in which the
CDR tray 3 is inserted in the CDR guide unit 2.

[0059]   When the CDR guide unit 2 is attached to the main
body of the image-forming apparatus 100, the CDR tray 3 is
driven by a motor installed in the main body and is conveyed
inward or outward.

[0060]   Fig. 6 is a diagram showing the manner in which
the CDR guide unit 2 and the CDR tray 3 are attached to the
main body.

[0061]   When the CDR guide unit 2 is attached to the main
body, it comes into contact with a contact point of the
guide sensor 10 constructed of a micro switch which is
installed in the main body and the output from the guide
sensor 10 changes accordingly. Then, when the CDR tray 3 on

which the CDR 4 is placed is inserted into the CDR guide
unit 2, the CDR tray 3 is moved by the motor installed in
the main body and is conveyed to the print position. When
the CDR tray 3 reaches the print position, the CDR-P sensor
11 constructed of a reflective photo-interrupter attached to
the main body detects light reflected from the CDR 4 and the
output from the CDR-P sensor 11 changes accordingly.

[0062]   Fig. 7 is a sectional view showing a paper path
(paper-medium supplier) used in a process of printing on a
paper sheet.

[0063]   The paper sheet placed on the paper tray 5 is
conveyed along the path denoted by a in Fig. 7, and is
output after an image is printed on the paper sheet at a
position where a head 6 is placed.

[0064]   Fig. 8 is a sectional view showing a recording-
medium (CDR) path (non-paper-medium supplier) used in a
process of printing on the CDR.

[0065]   The head 6 is moved upward from the position shown
in Fig. 7 so that a space for the CDR tray 3 to pass through
can be provided. In Fig. 8, the CDR tray 3 on which the CDR
4 is placed is inserted from the left, is conveyed to the
right end, and is conveyed leftward while an image is
printed on a printing area of the CDR 4 at a position where
the head 6 is placed.

[0066]   As is clear from Figs. 7 and 8, the path of the

paper-medium supplier and that of the non-paper-medium supplier are basically the same. Therefore, the paper-medium supplier and the non-paper-medium supplier cannot be used at the same time. More specifically, in this structure,

5 the process of printing on the paper sheet cannot be performed when the CDR guide unit 2 is attached.

[0067]   Next, a copying process performed by the image-forming apparatus 100 will be described below.

[0068]   Fig. 9 is a flowchart of a copying process

10 performed by the image-forming apparatus 100.

[0069]   When an operation to start the copying process is performed by the user, a signal output from the guide sensor 10 shown in Fig. 1 is monitored and it is determined whether the CDR guide unit 2 is attached to the image-forming

15 apparatus 100, as shown in Fig. 2, in Step 901.

[0070]   If the CDR guide unit 2 is not attached, it is determined whether the recording unit 115 shown in Fig. 1 can perform a recording process in Step 902. If the CDR guide unit 2 is attached to the image-forming apparatus 100,

20 the operation/display unit 108 shown in Fig. 1 displays a message indicating that the copying process cannot be performed in Step 911 and the process proceeds to Step 913. If it is determined that the recording unit 115 can perform the recording process in Step 902, the reading unit 107 and

25 the reading controller 106 shown in Fig. 1 are activated and

a reading process is started in Step 903.

[0071]   If it is determined that the recording process cannot be performed, the operation/display unit 108 shown in Fig. 1 displays a message indicating that the recording process cannot be performed in Step 912 and the process proceeds to Step 913.   In Step 913, an error-stop process is performed in which recording tasks are stopped and parameters are cleared.

[0072]   In Step 904, the data converter 105 converts image data obtained in Step 903 into print data which can be printed by the recording unit 115.   In Step 905, a command to supply the paper sheet from the automatic sheet feeder (ASF), that is, the paper tray 5 shown in Fig. 2, is transmitted to the recording unit 115 via the USB interface. In Step 906, the print data obtained in Step 904 is transmitted to the recording unit 115 via the USB interface.

[0073]   In Step 907, the recording unit 115 receives the print data transmitted in Step 906 via the USB interface and performs a process of printing the print data on the paper sheet supplied from the automatic sheet feeder.   In Step 908, it is determined whether an error has occurred during the printing process.   If a recoverable error occurs, for example, when there is no paper or ink or when paper jam occurs, an error recovery process is performed in Step 909 where a message prompting the user to take a suitable action

is shown or a key operation is received. If the error is resolved, the process proceeds to Step 910.

[0074] In Step 910, it is determined whether all of the pages are copied. If all of the pages are copied, a finishing process is performed and the copying process ends. If there are pages which are not yet copied, the process returns to Step 901.

Second Embodiment

[0075] Next, a facsimile-receiving process performed by an image-forming apparatus according to a second embodiment of the present invention will be described below.

[0076] The construction of the image-forming apparatus according to the second embodiment is similar to the image-forming apparatus 100 shown in Fig. 1.

[0077] Fig. 10 is a flowchart of the facsimile-receiving process performed by the image-forming apparatus according to the second embodiment of the present invention.

[0078] First, the communication controller 109 shown in Fig. 1 detects whether there is a call signal (CI) transmitted via the communication line 131. If the call signal (CI) is transmitted, the line is acquired and it is determined whether the call is a facsimile transmission by CNG tone detection or silence detection in Step 1001.

[0079] If it is determined that the call is a facsimile transmission, a facsimile communication process is started

and image data transmitted via the communication line 131 is received in Step 1002. Then, after all of the image data is received, the communication line is closed and the receiving process is finished. Then, the encoder/decoder 111 shown in Fig. 1 decodes the received image data and the data converter 105 converts the obtained data into print data which can be printed by the recording unit 115 in Step 1003.

[0080] In Step 1004, the signal output from the guide sensor 10 shown in Fig. 1 is monitored and it is determined whether the CDR guide unit 2 is attached to the image-forming apparatus 100. If the CDR guide unit 2 is not attached, it is determined whether the recording unit 115 shown in Fig. 1 can perform the recording process in Step 1005. If the CDR guide unit 2 is attached to the image-forming apparatus 100, the operation/display unit 108 shown in Fig. 1 displays a message that the recording process cannot be performed in Step 1010 and the process proceeds to Step 1012.

[0081] If it is determined that the recording unit 115 can perform the recording process in Step 1005, a command to supply the paper sheet from the automatic sheet feeder (ASF), that is, the paper tray 5 shown in Fig. 2, is transmitted to the recording unit 115 via the USB interface in Step 1006. If it is determined that the recording process cannot be preformed, the operation/display unit 108 shown in Fig. 1

displays a message indicating that the recording process

cannot be performed in Step 1011 and the process proceeds to

Step 1012. In Step 1012, the print data obtained in Step

1003 is stored in the image memory 104 shown in Fig. 1.

5   [0082]   In Step 1007, the print data obtained in Step 1003

is transmitted to the recording unit 115 via the USB

interface. In Step 1008, the recording unit 115 receives

the print data transmitted in Step 1007 via the USB

interface and performs a process of printing the print data

10   on the paper sheet supplied from the automatic sheet feeder.

In Step 1009, it is determined whether all of the data are

processed. If all of the data are processed, a finishing

process is performed and the facsimile-receiving process

ends. If there are data which are not yet processed, the

15   process returns to Step 1004.

Third Embodiment

[0083]   Next, a PC printing process performed by an image-

forming apparatus according to a third embodiment of the

present invention will be described below.

20   [0084]   The construction of the image-forming apparatus

according to the third embodiment is similar to the image-

forming apparatus 100 shown in Fig. 1.

[0085]   Fig. 11 is a flowchart of the PC printing process

performed by the image-forming apparatus according to the

25   third embodiment of the present invention.

[0086]   First, in Step 1101, it is determined whether print data is received from the external information processing terminal shown in Fig. 1 which is connected to the image-forming apparatus via the USB interface. When the print data is received, it is determined whether the recording unit 115 shown in Fig. 1 can perform the recording process in Step 1102. If it is determined that the recording process cannot be performed, the error-stop process is performed and the process ends. If it is determined that the recording process can be performed, the print data is transmitted to the recording unit 115 in Step 1103.

[0087]   In Step 1104, the print data transmitted to the recording unit 115 is analyzed and it is determined whether a command to print on the CDR is issued. The process proceeds to Step 1105 if a command to print the CDR is issued, and the process proceeds to Step 1113 if a command to print on other medium (using the automatic sheet feeder) is issued. In Step 1105, the signal output from the guide sensor 10 shown in Fig. 1 is monitored and it is determined whether the CDR guide unit 2 is attached to the image-forming apparatus 100.

[0088]   If the CDR guide unit 2 is not attached, the operation/display unit 108 shown in Fig. 1 displays an error message indicating that the CDR guide unit 2 is not attached

in Step 1106, and the process waits until the CDR guide unit 2 is attached.

[0089]   If the CDR guide unit 2 is attached, the CDR guide unit 2 is activated in Step 1107. When the CDR guide unit 2 is activated, it is determined whether the CDR tray 3 shown in Fig. 3 is installed in Step 1108 by monitoring light reflected from the CDR tray 3 with the CDR-P sensor 11 shown in Fig. 1.

[0090]   If the CDR tray 3 is not installed, the operation/display unit 108 shown in Fig. 1 displays an error message indicating that the CDR tray 3 is not installed in Step 1109, and the process waits until the CDR tray 3 is installed.

[0091]   If the CDR tray 3 is installed, the CDR tray 3 is inserted into the image-forming apparatus 100 and it is determined whether the CDR 4 is placed on the CDR tray 3 in Step 1110 by monitoring light reflected from the CDR 4 with the CDR-P sensor 11 shown in Fig. 1.

[0092]   If the CDR 4 is not placed on the CDR tray 3, the operation/display unit 108 shown in Fig. 1 displays an error message indicating that there is no CDR in Step 1111, and the process waits until the CDR 4 is loaded.

[0093]   If the CDR 4 is placed on the CDR tray 3, a process of printing on the CDR is started in Step 1112, and the process ends when all of the print data is printed.

[0094]   In Step 1113, the signal from the guide sensor 10 shown in Fig. 1 is monitored and it is determined whether the CDR guide unit 2 is attached to the image-forming apparatus 100. If the CDR guide unit 2 is attached to the image-forming apparatus 100, the operation/display unit 108 shown in Fig. 1 displays a message indicating that the printing process cannot be performed in Step 1114.

[0095]   If the CDR guide unit 2 is not attached to the image-forming apparatus 100, the automatic sheet feeder (ASF), that is, the paper tray 5, is activated in Step 1115, and the process of supplying the paper sheet is started. In Step 1116, it is determined whether the paper sheet is normally supplied by the automatic sheet feeder. If it is determined that there is no paper sheet, the operation/display unit 108 shown in Fig. 1 displays an error message indicating that there is no paper sheet in Step 1117, and the process waits until it is determined that the paper sheet is loaded. If it is determined that the paper sheet is loaded, a process of printing on the paper sheet is performed in Step 1118.

[0096]   In Step 1119, it is determined whether an error has occurred in the recording unit. If a recoverable error occurs, for example, when there is no ink or when paper jam occurs, the operation/display unit 108 shown in Fig. 1 displays an error message explaining the situation in Step

1120 and the process waits until the error is resolved.
When the error is resolved, it is determined whether there
is print data for the next page which is not yet printed in
Step 1121. The process returns to Step 1113 if there is
data which is not yet printed, and the process ends if all
of the data are printed.

Fourth Embodiment

[0097]   Next, a memory-card printing process performed by
an image-forming apparatus according to a fourth embodiment
of the present invention will be described below.

[0098]   The construction of the image-forming apparatus
according to the fourth embodiment is similar to the image-
forming apparatus 100 shown in Fig. 1.

[0099]   Fig. 12 is a flowchart of the memory-card printing
process performed by the image-forming apparatus according
to the fourth embodiment of the present invention.

[0100]   When a command to start the memory-card printing
process is issued by the user, the signal output from the
guide sensor 10 shown in Fig. 1 is monitored and it is
determined whether the CDR guide unit 2 is attached to the
image-forming apparatus 100, as shown in Fig. 2, in Step
1201. If the CDR guide unit 2 is not attached, it is
determined whether the recording unit 115 shown in Fig. 1
can perform the recording process in Step 1202. If the CDR
guide unit 2 is attached, the operation/display unit 108

shown in Fig. 1 displays a message indicating that the printing process cannot be performed since the CDR guide unit 2 is attached to the image-forming apparatus 100 in Step 1212, and the process proceeds to Step 1214.

[0101]   If it is determined that the recording unit 115 can perform the recording process in Step 1202, image data stored in a memory card which is inserted in a memory card drive 116 shown in Fig. 1 is acquired via the USB interface under the control of a memory card controller 117 in Step 1203.   If it is determined that the recording process cannot be performed, the operation/display unit 108 shown in Fig. 1 displays a message indicating that the recording process cannot be performed in Step 1213 and the process proceeds to Step 1214.

[0102]   In Step 1204, it is determined whether the image data is acquired normally.   If the image data is acquired normally, the process proceeds to Step 1205.   If the image data is not acquired normally because, for example, the memory card is not inserted, image data stored in the memory card is damaged, or the memory card drive is malfunctioning, the process proceeds to Step 1214.

[0103]   In Step 1214, the error-stop process is performed in which the recording tasks are stopped and the parameters are cleared.   In Step 1205, the data converter 105 converts the image data acquired in Step 1203 into print data which

can be printed by the recording unit 115.

[0104]   In Step 1206, a command to supply the paper sheet

from the automatic sheet feeder (ASF), that is, the paper

tray 5 shown in Fig. 2, is transmitted to the recording unit

115 via the USB interface.   In Step 1207, the print data

obtained in Step 1205 is transmitted to the recording unit

115 via the USB interface.   In Step 1208, the recording unit

115 receives the print data transmitted in Step 1207 via the

USB interface and performs a process of printing on the

paper sheet supplied from the automatic sheet feeder.

[0105]   In Step 1209, it is determined whether an error

has occurred during the printing process.   If a recoverable

error occurs, for example, when there is no paper or ink or

when paper jam occurs, an error recovery process is

performed in which a message prompting the user to take a

suitable action is shown or a key operation is received in

Step 1210.   If the error is resolved, the process proceeds

to Step 1211.   In Step 1211, it is determined whether all of

the pages are printed.   If all of the pages are printed, a

finishing process is performed and the PC printing process

ends.   If there are pages which are not yet printed, the

process returns to Step 1201.

[0106]   In the above-described embodiments, the image-

forming apparatus includes a first monitor which detects

whether a non-paper-medium supplier is attached to the main

body of the image-forming apparatus. When a normal copying

process is selected but the first monitor determines that

the non-paper-medium supplier is attached to the main body

of the image-forming apparatus, the copying process is

5   stopped immediately. Therefore, a copy image can be

prevented from being printed on a non-paper medium such as a

CDR and the image-forming apparatus can immediately return

to the standby mode without performing unnecessary processes

such as activation of a reading unit and a recording unit.

10   In addition, an error message indicating that the printing

process cannot be performed since the non-paper-medium

supplier is attached is shown on the main body of the image-

forming apparatus. Thus, the reason why the printing

process has stopped can be displayed on the main body of the

15   image-forming apparatus.

[0107]   In addition, in the case in which the image-

forming apparatus has a facsimile function, the first

monitor detects whether the non-paper-medium supplier is

attached to the main body of the image-forming apparatus

20   when a facsimile is received. If the non-paper-medium

supplier is attached, the received facsimile image data is

not transmitted to the recording unit but is recorded in s

storage medium installed in the main body. Accordingly, the

facsimile image can be immediately and reliably stored and

25   can be prevented from being printed on the non-paper medium

such as a CDR. Then, if the non-paper-medium supplier is removed, the facsimile image data can be printed on a paper medium.

[0108] In addition, in the case in which the image-forming apparatus has a function of reading image data stored in a storage medium such as a memory card which can be detachably attached to the main body of the image-forming apparatus, the first monitor detects whether the non-paper-medium supplier is attached to the main body of the image-forming apparatus when a command to print the image data stored in the storage medium attached to the main body is issued. If the non-paper-medium supplier is attached, the process of printing the image data stored in the storage medium is stopped. Therefore, the image data can be prevented from being printed on the non-paper medium such as a CDR and the image-forming apparatus can immediately return to the standby mode without performing unnecessary processes such as activation of the reading unit and the recording unit.

[0109] In addition, the above-described image-forming apparatus further includes a designating unit for designating whether the paper medium is to be supplied to the printing unit by the paper-medium supplier or the non-paper medium is to be supplied to the printing unit by the non-paper-medium supplier. When the image data obtained

from the reading unit, the image data read from the storage

medium attached to the main body, or the print data

transmitted from the externally connected PC is printed and

when the designating unit designates that the non-paper-

5   medium is to be supplied by the non-paper-medium supplier,

the process of activating the reading unit, reading from the

storage medium, or printing the print data obtained from the

externally connected PC is stopped if the first monitor

determines that the non-paper-medium supplier is not

10   attached to the main body. Therefore, the image data can be

prevented from being printed on a wrong medium.

[0110]   In addition, when the image data obtained from the

reading unit, the image data read from the storage medium

attached to the main body, or the print data transmitted

15   from the externally connected PC is printed and when the

designating unit designates that the paper-medium is to be

supplied by the paper-medium supplier, the process of

activating the reading unit, reading from the storage medium,

or printing the print data obtained from the externally

20   connected PC is stopped if the first monitor determines that

the non-paper-medium supplier is not attached to the main

body. Therefore, the image data can be prevented from being

printed on a wrong medium.

[0111]   In addition, the above-described image-forming

25   apparatus further includes a second monitor which detects,

for example, whether the medium such as a CDR is loaded in the non-paper-medium supplier and determines whether the process of supplying the medium is possible and a display unit which displays an error massage on the main body of the

5 image-forming apparatus depending on the result of the determination obtained by the second monitor. When the image data obtained from the reading unit, the image data read from the storage medium attached to the main body, or the print data transmitted from the externally connected PC

10 is printed and when the designating unit designates that the non-paper-medium is to be supplied by the non-paper-medium supplier, even if the first monitor determines that the non-paper-medium supplier is attached to the main body, the process of activating the reading unit, reading from the

15 storage medium, or printing the print data obtained from the externally connected PC is stopped if the second monitor determines that the non-paper-medium supplier cannot be driven, and an error message corresponding to the situation is displayed on the main body of the image-forming apparatus.

20 Thus, the reason why the process cannot be performed can be displayed on the main body, and it is possible to prompt the user to take a suitable action, for example, to insert the medium such as a CDR.

[0112] As described above, the image-forming apparatus

25 according to the present invention includes a first monitor

which detects whether a non-paper-medium supplier is

attached to the main body of the image-forming apparatus.

When a normal copying process is selected but the first

monitor determines that the non-paper-medium supplier is

5   attached to the main body of the image-forming apparatus,

the copying process is stopped immediately. Therefore, the

present invention provides an advantage in that a copy image

can be prevented from being printed on a non-paper medium

such as a CDR and the image-forming apparatus can

10   immediately return to the standby mode without performing

unnecessary processes such as activation of a reading unit

and a recording unit. In addition, an error message

indicating that the printing process cannot be performed

since the non-paper-medium supplier is attached is shown on

15   the main body of the image-forming apparatus. Thus, the

reason why the printing process has stopped can be displayed

on the main body of the image-forming apparatus.

Fifth Embodiment

[0113]   In a fifth embodiment, components similar to those

20   of the first to fourth embodiments are denoted by the same

reference numerals and explanations thereof are thus omitted.

[0114]   With reference to Fig. 13, a communication

controller 109 includes a modulator/demodulator (MODEM), a

network control unit (NCU), etc., and is connected to an

25   analog communication line (public switched telephone network

(PSTN)) 131 and an external telephone 132. The
communication controller 109 performs communication control
under the T.30 protocol and line control of call-ins and
call-outs on the communication line. The communication
5   controller 109 will be described in more detail below with
reference to Fig. 14.

[0115]   Fig. 14 is a block diagram showing the detailed
construction of the communication controller 109.

[0116]   The communication controller 109 includes CML
10   relays 201 and a pulse relay (P relay) 202, an electrical
circuit 203, a direct current (DC) cut capacitor 204, a 600-
to-600 ohm transformer 205, a two-to-four-wire converter
circuit 206, a CNG detector circuit 207, a DTMF detector
circuit 213, a modem 215, a CPU bus 121, and a call-signal
15   detector circuit 216.

[0117]   The CML relays 201 are used for switching a line
208 between the telephone and the facsimile-receiving unit,
and the pulse relay (P relay) 202 is used for generating a
dial pulse. The electrical circuit 203 serves as a RET coil
20   which forms a direct current loop or has a similar function,
and the 600-to-600 ohm transformer 205 separates the line
from the facsimile-receiving unit.

[0118]   The DC cut capacitor 204 supplies only the
alternating current to the 600-to-600 ohm transformer 205,
25   and the two-to-four-wire converter circuit 206 separates the

output from the 600-to-600 ohm transformer 205 between

transmission (TX) and reception (RX). The modem 215

modulates and demodulates the facsimile signal, and is

connected to the CPU bus 121.

5 [0119] The call-signal detector circuit 216 detects a

call signal, and a capacitor 212 is another DC cut capacitor.

The output signal from a transformer 211 is used for

monitoring signals on the line 208 and a line 209 connected

to the telephone when the CML relays 201 are switched to the

10 telephone.

[0120] The CNG detector circuit 207 detects the CNG tone

and outputs an output signal 210, and is constructed of a

PLL circuit. In addition, the DTMF detector circuit 213

outputs an output signal 214.

15 [0121] Fig. 15 is a flowchart of a facsimile-receiving

process according to the fifth embodiment.

[0122] First, in Step 301, the call-signal detector

circuit 216 determines whether there is a call from the

communication line. If there is a call, the guide sensor 10

20 detects whether the CDR guide unit 2 is attached in Step 302.

[0123] If the CDR guide unit 2 is not attached in Step

302, the process of printing on the paper sheet can be

performed using the paper path, that is, the paper-medium

supplier. Therefore, a facsimile-data-receiving process is

25 performed in Step 303.

[0124]   The facsimile-data-receiving process is performed
in accordance with a receiving mode set in the image-forming
apparatus 100. More specifically, if the receiving mode is
set to a forced-facsimile-receiving mode, the CML relays 201
are switched to the modem and a signal used for receiving a
facsimile (for example, a CED tone) is transmitted. If the
receiving mode is set to a manual-facsimile-receiving mode,
the CML relays 201 are not switched and the call is received
by the external telephone 132. In Step 304, the received
facsimile image data is printed on the paper sheet supplied
by the paper-medium supplier and the facsimile-receiving
process is finished.

[0125]   If the CDR guide unit 2 is attached in Step 302,
the process of printing on the paper sheet using the paper
path, that is, the paper-medium supplier cannot be performed
as described above. Therefore, the call is received by the
external telephone 132 irrespective of the receiving mode
set in the image-forming apparatus 100.

[0126]   If the user who has started the CDR printing
process becomes aware of the call and receives it with the
external telephone, it is determined whether the CNG tone is
detected by the CNG detector circuit 207 in Step 305. If
the CNG tone is not detected, it means that the call is a
telephone call. Therefore, the facsimile-receiving process
is finished. If the CNG tone is detected, the CML relays

201 are switched to the modem and the facsimile-data-receiving process is performed in Step 306.

[0127]   When the user picks up the telephone, he or she hears the CNG tone from the calling machine and realizes that the call is a facsimile transmission. Therefore, the user can remove the CDR guide unit 2 so that the received facsimile image can be printed on the paper sheet supplied by the paper-medium supplier. In Step 307, the guide sensor 10 detects whether the CDR guide unit 2 is removed. If the CDR guide unit 2 is removed, the process proceeds to Step 308 and the process of printing the facsimile image on the paper sheet supplied by the paper-medium supplier is performed and the facsimile-receiving process is finished.

[0128]   If the CDR guide unit 2 is still attached in Step 307, the process of printing on the paper sheet cannot be performed. Accordingly, the process proceeds to Step 309 and the received image data is stored in the memory 103.

[0129]   As described above, even if a facsimile is received while the CDR guide unit 2 is attached and the CDR printing process is performed, the user can see the facsimile by printing it on the paper sheet.

Sixth Embodiment

[0130]   In the fifth embodiment, the facsimile data is received when the CNG tone from the calling machine is detected after the call is received by the user with the

telephone.   In the sixth embodiment, when the user receives
the call with the telephone, the user can start the
facsimile-data-receiving process by operating the telephone.

[0131]   Since the sixth embodiment is similar to the fifth
embodiment except for the facsimile-receiving process, only
a flowchart of the facsimile-receiving process according to
the sixth embodiment will be described below.

[0132]   Fig. 16 is a flowchart of the facsimile-receiving
process according to the sixth embodiment.

[0133]   First, in Step 401, the call-signal detector
circuit 216 determines whether there is a call from the
communication line.   If there is a call, the guide sensor 10
detects whether the CDR guide unit 2 is attached in Step 402.
If the CDR guide unit 2 is not attached, the process of
printing on the paper sheet can be performed using the paper
path, that is, the paper-medium supplier.   Therefore, a
facsimile-data-receiving process is performed in Step 403.

[0134]   The facsimile-data-receiving process is performed
in accordance with a receiving mode set in the image-forming
apparatus 100.   More specifically, if the receiving mode is
set to a forced-facsimile-receiving mode, the CML relays 201
are switched to the modem and a signal used for receiving a
facsimile (for example, a CED tone) is transmitted.   In
addition, if the receiving mode is set to a manual-
facsimile-receiving mode, the CML relays 201 are not

switched and the call is received by the external telephone 132. In Step 404, the received facsimile image data is printed on the paper sheet supplied by the paper-medium supplier and the facsimile-receiving process is finished.

5 [0135] If the CDR guide unit 2 is attached in Step 402, the process of printing on the paper sheet using the paper path, that is, the paper-medium supplier cannot be performed as described above. Therefore, the call is received by the external telephone 132 irrespective of the receiving mode 10 set in the image-forming apparatus 100.

[0136] If the user who has started the CDR printing process becomes aware of the call, receives the call with the external telephone, and finds out that the call is a facsimile transmission, the user enters number "25" on the 15 telephone to select the facsimile-data-receiving process. The number "25" is the default number and can be changed to an arbitrary number by the user.

[0137] In Step 405, it is determined whether the DTMF tone corresponding to "25" is detected by the DTMF detector 20 circuit 213. If the DTMF tone corresponding to "25" is not detected, it means that the call is a telephone call. Therefore, the facsimile-receiving process is finished. If the DTMF tone corresponding to "25" is detected, the CML relays 201 are switched to the modem and the facsimile-data-25 receiving process is performed in Step 406.

[0138]   During this time, the user can remove the CDR

guide unit 2 so that the received facsimile image can be

printed on the paper sheet supplied by the paper-medium

supplier.   In Step 407, the guide sensor 10 detects whether

the CDR guide unit 2 is removed.   If the CDR guide unit 2 is

removed, the process proceeds to Step 408 and the process of

printing the facsimile image on the paper sheet supplied by

the paper-medium supplier is performed and the facsimile-

receiving process is finished.

[0139]   If the CDR guide unit 2 is still attached in Step

407, the process of printing on the paper sheet cannot be

performed.   Accordingly, the process proceeds to Step 409

and the received image data is stored in the memory 103.

[0140]   Although the DTMF tone is detected in the

flowchart shown in Fig. 16, the facsimile-data-receiving

process can also be selected by detecting pulses

corresponding to the number if the telephone uses pulse

dialing.

[0141]   According to the present embodiment, even if a

facsimile is received while the CDR guide unit 2 is attached

and the CDR printing process is performed, the user can see

the facsimile by printing it on the paper sheet.

[0142]   Accordingly, in the above-described embodiments,

if a facsimile is received while the image-forming apparatus

is set to a CDR print mode and the data to be printed on the

CDR is being created by the user using the PC, the user is informed that the facsimile call is received. Accordingly, the user can change the setting of the MFP to a paper print mode and the received facsimile can be printed on the paper

5 sheet. Therefore, a problem that the facsimile cannot be received because the memory is full does not occur.

[0143] According to the present invention, the call from the line is not received when the non-paper-medium supplier is attached to the main body of the image-forming apparatus

10 and a facsimile-switching unit causes the facsimile-receiving unit to receive the call when the call is determined to be the facsimile transmission after the line is acquired by the telephone. Accordingly, even when the non-paper-medium supplier is attached to the main body of

15 the image-forming apparatus, paper jam, which occurs when the process of printing on the paper medium is forcibly performed, can be prevented.

[0144] In addition, according to the present invention, if it is determined that the non-paper-medium supplier is

20 not attached to the main body of the image-forming apparatus, the received image is printed by the printing unit. Accordingly, the problem that the facsimile image cannot be received because the memory is full does not occur.

[0145] While the present invention has been described

25 with reference to what are presently considered to be the

preferred embodiments, it is to be understood that the
invention is not limited to the disclosed embodiments. On
the contrary, the invention is intended to cover various
modifications and equivalent arrangements included within
5   the spirit and scope of the appended claims. The scope of
the following claims is to be accorded the broadest
interpretation so as to encompass all such modifications and
equivalent structures and functions.